

**U.S. Consumer Product Safety Commission
LOG OF MEETING**

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JUN 10 2003

**SUBJECT: National Fire Protection Association (NFPA) World Safety Conference
- Education Session Presentation: "Aging Electrical Wiring Systems in
Buildings"**

DATE OF MEETING: May 18-21, 2003

LOG ENTRY SOURCE: William H. King, Jr., ES *W.H.K.*

DATE OF LOG ENTRY: June 3, 2003

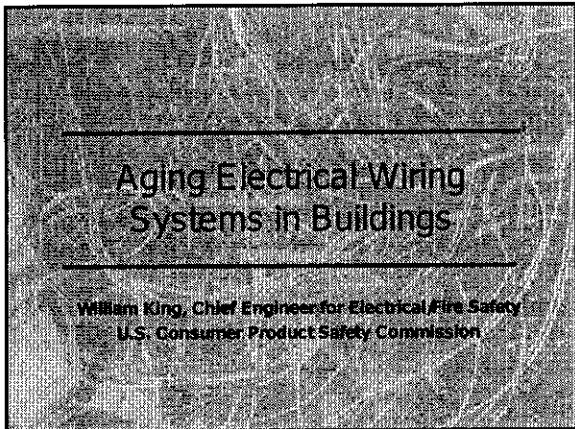
LOCATION: Dallas Convention Center, Dallas, TX

CPSC ATTENDEE(S): William H. King, Jr., ES

NON-CPSC ATTENDEE(S): Registrants at the NFPA World Safety Conference

SUMMARY OF MEETING: A copy of the outline of remarks made by Mr. King at Session SU34 is attached. Mr. King also attended other meetings while at the conference; in particular the meetings sponsored by the Electrical Section of NFPA.

CPSC 6 (b)(1) Cleared *6-4-03*
AB
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Firms Notified,
Comments Processed. *✓*



Outline

- Fire Incident Data
- Inspection/Correction
- Outreach
- New Technologies
- Conclusions

2

Data

Dwelling Fires Related to Electrical Wiring Systems:
40,000 fires, 350 deaths, 1,400 injuries (annual average)

Older homes at greater risk; new homes not immune.

3

Plan to Obtain Better Data

- Fire Protection Research Foundation proposal on wiring
 - Evaluation of wiring systems in existing homes
 - Improving fire reports
 - Lab testing of old components

4

Wire Safety Issues

- Aging, environmental stress
- Improper wiring practices
- Appliance/equipment load exceeds system design capacity

5

Potential Wire Safety Issues

- Environmental Stress - Chafing, embrittlement, and corrosion
- Improper installation
- Mishandling of wiring during maintenance
- Accumulated damage as wire ages

6

Current Practices

- Conformance with existing regulations, codes, and standards and revisions to them.
- Training of inspectors and electricians.
- Inspection, assessment, and maintenance of wire.
- Engineering improvements.
- Safety investigations.
- Analysis of wire system data.
- Exchange of technical information.

7

Current Technology Initiatives

- **Diagnostics:** non-destructive evaluation (NDE) techniques, inspection and detection technologies, and monitoring sensors for identifying wire system defects.
- **Failure Mechanisms:** causes and models of wire system failure and analysis of maintenance data.
- **Interconnection Technologies:** improved connectors, such as at terminations and splices in wire systems, training, management tools, and advanced distribution technologies, such as modular wiring, fiber optics, and wireless technologies.
- **New Materials:** new materials for wire system components, such as conductors and insulation, and novel approaches for wire systems such as the application of microelectronic technology.

8

Common Issues

- Faulty wiring poses a risk to public health and safety; it may lead to failure of essential functions and even to smoke and fire.
- Managing aging wire systems is expensive and time-consuming.
- Inspection, testing, and maintenance of wire systems is a technical challenge.
- Most diagnostic procedures can detect only "hard failures" that result in serious deterioration of electrical integrity.
- Our knowledge about how wire systems age and how they fail is limited.

9

Common Issues

- There are limitations to our electrical codes and standards.
- Wire systems are becoming more complex with increasing computerization of operations and of information about those operations.
- Wire system maintenance is very expensive and it is difficult to get funding to address wiring issues before a system break down.
- Current practices flow from – and are limited by – the current state-of-the-art of wire systems technology in terms of design, installation, diagnosis and maintenance.

10

CPSC Actions

- CPSC-sponsored electrical distribution system fire investigations in the 1980s conclude older homes at greatest risk
- CPSC priority project in early 1990s develops strategies:
 - inspection code for existing residences
 - application of new technology to older residences
 - demonstrate practical safety improvements
- CPSC joins National Science and Technology Council “Wire System Safety Interagency Working Group” in 2000, a joint agency effort to look at aging and deterioration of wiring systems

11

Wire System Safety Interagency Working Group

Consumer Product Safety Commission	National Aeronautics and Space Administration
Department of Commerce	National Science Foundation
Department of Defense	Nuclear Regulatory Commission
Office of the Secretary of Defense	In addition, the following organizations are represented on the WSSIWG:
United States Air Force	Defense Nuclear Facilities Safety Board
United States Navy	Office of Management and Budget
United States Army	Office of Science and Technology Policy
Department of Energy	National Partnership for Reinventing Government
Department of Transportation	National Transportation Safety Board (observer)
Federal Aviation Administration	
Federal Railroad Administration	
Federal Transit Administration	
US Coast Guard	
Food and Drug Administration	

12

Inspection Code for Existing Homes

- NFPA 73
- Complements the *National Electrical Code* (NFPA 70)
- Principal members include CPSC, UL, IEEE, NAHB, IAEL, NECA, NEMA, EEI
- New proposals are now being accepted.

13

New Technology

- CPSC-sponsored research contract in 1995
- Arc-Fault Circuit-Interrupter (AFCI) technology identified
- First generation AFCI devices on the market for several years
- AFCI requirement introduced in the 1999 edition of the *NEC*
- Many proposals for the 2005 *NEC*
 - Report on Proposals to be issued soon
 - Comment period ends October 31, 2003

14

CPSC Demonstrations

- Four old homes inspected and improved (Washington, DC area, Atlanta, St. Louis and Redlands, CA)
- TV-quality videos produced
- CPSC Guide Booklet "Home Wiring Hazards"
- Nationwide distribution of over 1000 sets of materials to state and local fire and electrical officials

15

Current CPSC Activities

- Research Project on Residential Electrical System Aging - a cooperative effort with The Fire Protection Research Foundation of NFPA
- Government-owned housing: addressing older wiring with AFCIs
- Outreach efforts via media (publications, video tapes, presentations)
- Continuing efforts via codes and standards
 - NFPA 70 proposals for additional AFCI protection
 - NFPA 73, evaluation criteria for installed systems

16

Conclusion

**The aging of wire systems is
a national safety issue.**

17

Recommendations

- Three basic strategies are necessary to improve wire system safety:
 - Altering the perception of wire systems.
 - Increasing collaboration between industry, academia, and the government.
 - Improve wire system technology.

18
